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File Number PMIC-MA03-469-35

January 28, 1985

PO-84-031
RAKM/2/2

National Aeronautics and Space Administration
George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

Attention: JA02/Mr. Jack Bean (2)

Subject: Data Requirement MA-03, Progress Report
Contract NAS8-32712

Dear Mr. Bean:

In accordance with Data Requirement (DR) MA-03, Teledyne Brown Engineering, a Division of Teledyne Industries, Inc., submits the "Payload Missions Integration Progress Report," dated January 28, 1985. Since this is a Type 3 DR, distribution is made per your prior direction.

Sincerely,

TELEDYNE BROWN ENGINEERING
A DIVISION OF TELEDYNE INDUSTRIES, INC.

G. R. Frame

G. R. Frame
Contract Manager

Enclosure

cc: w/enclosures

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PMIC/Mr. Mitchell

(NASA-CR-171331) DATA REQUIREMENT (DR)
MA-03: PAYLOAD MISSIONS INTEGRATION
Progress Report, 17 Nov. 1984 - 15 Jan. 1985
(Teledyne Brown Engineering) 47 p
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DATA REQUIREMENT (DR) MA-03

PAYLOAD MISSIONS INTEGRATION
PROGRESS REPORT

November 17, 1984, through January 15, 1985
(WBS 05.1)

January 28, 1985

Contract Number: NAS8-32712

Space Integration Division
Teledyne Brown Engineering
Building 4708 (Mail Stop PMIC/TBE)
George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

ABSTRACT

This document summarizes Teledyne Brown Engineering's (TBE) progress on the Payload Missions Integration Contract (PMIC) during the report period from November 17, 1984, through January 15, 1985. It fulfills the requirements of Data Requirement (DR) MA-03 Progress Report.



for R. A. K. Mitchell
Space Integration Division

TABLE OF CONTENTS

		Page
1	INTRODUCTION	1-1
2	MANAGEMENT SUMMARY	2-1
3	GENERAL	3-1
4	SPACELAB MISSION NO. 1 EXTENSION (EOM-1)	4-1
5	SPACELAB MISSION NO. 2	5-1
6	ASTRO-1 MISSION.	6-1
7	SPACELAB MISSION NO. 3	7-1
8	MIDDECK MISSION.	8-1
9	OAST-1 MISSION	9-1
10	MSL-2 MISSION.	10-1
11	EASE/ACCESS MISSION.	11-1
12	MPRESS.	12-1
13	MULTI-MISSION.	13-1
14	PREMISSION DEFINITION.	14-1

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1. INTRODUCTION

This report is organized for use by the Spacelab Payload Project Office (SPP0). The Management Summary summarizes the contents of the report. The General section provides information which concerns two or more missions or is nonmission oriented. The Mission sections provide information relative to payload integration progress on the specific missions for which TBE is responsible in its PMI contractor role.

Within each section of the report, information is organized in Work Breakdown Structure (WBS) number sequence. Only active WBS elements are identified by number and title for reporting purposes.

2. MANAGEMENT SUMMARY

Highlights of the PMIC contract effort during this period are summarized below.

General

- o Four Change Order Modifications (C/O Mods) were received from MSFC, and seven C/O Mod responses were submitted by TBE.
- o The MPE Inventory Control System is under revision to improve its support capability to SPP0 mission managers.

Spacelab (SL) Mission 1 Extension (EOM-1)

- o Hardware development for the original flight configuration is almost complete. Ninety percent of the fabricated hardware is complete; 98 percent of the purchased items have been received.
- o We supported activities associated with the addition of three new experiments to the EOM-1/2 mission: ATMOS, ALEA, and MRSE.

SL-2 Mission

- o Four MPE shipments were made during the period from November 30 through January 9.
- o We supported final integration of the cruciform and instruments, installation and testing of the Experiment 7 Backup Launch Lock, and final alignment of the PCA.
- o The last four action items from the Phase III Flight Safety Review were closed.
- o A detailed analysis of high stress intensity areas in the HRTS experiment was completed and submitted.
- o A Materials Usage Agreement Certification was written for the SL-2 MPE.
- o We supported crew training in the PCTC and HOSC.

Astro-1 Mission

- o MPE fabrication progress continued with significant effort applied to the Cruciform Assembly, the Integrated Radiator System (IRS), the Payload Support Structure Assembly (PSSA), Optical Sensor Package (OSP), build only hardware, electrical cables, ground support equipment (GSE), and Wide Field Camera (WFC).
- o Assembly and installation drawings for the integrated payload, PSSA, integrated cable harnesses, cruciform MLI, and the OSP were baselined and released.
- o Significant MPE final design and analysis activities were performed.
- o WFC and Thermal Gradient Sensor Subsystem (TGSS) development progressed.

SL-3 Mission

- o Revision A of the Stowage Installation Procedures was completed.
- o Several environmental control/thermal analyses were/are being conducted to respond to concerns.
- o A revision to the FRR coupled loads data was compared to the design analysis. All margins of safety were positive.
- o Payload flight operations integration tasks are progressing satisfactorily towards an April 1985 launch.

Middeck Mission

- o Effort to integrate the GRID computer with the Middeck Electronics Module in support of the second middeck ADSF flight was initiated.

MSL-2 Mission

- o A dedicated operations team was formed to work and direct major project and component development activities. Team

members work real-time problems and expedite buildup activities.

- o MPE hardware fabrication is approximately 95 percent complete, and completed hardware is being installed on the adapter structure.
- o System Control Unit (SCU) hardware fabrication was completed and software for qualification testing is under development.
- o The Experiment Tape Recorder (ETR) thermal vacuum testing was successfully completed.

EASE/ACCESS Mission

- o Completion of all MPE manufacturing is expected by March 31, 1985.
- o Six new drawings were baselined, and four ECOs and three revisions were issued. The CEI Part II Specification was submitted for baselining.
- o Of 39 DNs submitted against TBE-generated documentation at the IPL FDOR, 15 have been closed, 14 have been answered, and 10 are in work. No project delays will result from DNs received.

MPRESS

- o MPRESS modifications specified in ECPs 127, 133, and 154 are progressing nicely.
- o MPRESS generic models have been refined, and maximum internal member loads for the latest have been generated.

PREMISSION DEFINITION

- o A premission definition and compatibility assessment of a Ballistic Missile Defense (BMD) Shuttle Experiments Program has started.

3. GENERAL

WBS 05.0 - PROJECT MANAGEMENT

WBS 05.1 - Performance Management and Administration

The project management contract deliverables this period were the DR MA-04, Financial Management Reports, submitted on November 16 and December 14, 1984, and January 15, 1985, and the DR MA-03, Progress Report, submitted on November 28, 1984.

No Supplemental Agreements (SAs) were incorporated into the contract, but eight change proposals totaling \$8,138,761 were negotiated.

During this period, four Change Order Modifications (C/O Mods) were received from MSFC. We responded to seven C/O Mods and submitted seven Engineering Change Proposals (ECPs) during this same period. Responses are being prepared for seven other C/O Mods at the period's end. There are currently 34 change proposals with a cost impact in the MSFC review/procurement cycle.

WBS 05.2 - Information Management

During this period, PMIC Information Management activities resulted in the reproduction of 104,432 pages in support of various SPP0 and PMIC documentation requirements. We added 45 new documents to our master files.

During this period, PMIC developed a plan for a coordinated scheduling system for SPP0, PP&C. The startup activities for this system, which were being implemented during this period, included inputting 7 payload/partial payload master schedules and a summary schedule; 19 materials processing project master schedules and 2 summary schedules; and 25 materials processing project detailed schedules into the IGDS system.

Concurrent effort includes preparation for publishing a monthly payloads report and a materials processing report on February 1, 1985, (i.e., development of a schedule symbology page, abbreviations/acronyms/terms page, etc.).

WBS 75.0 - PAYLOAD INTEGRATION REQUIREMENTS

WBS 75.9 - Ground Operations Analysis and Requirements Definition

During the period, 123 line items were added to the MPE Inventory System, for a total of 564 individual parts. MPE inventory is currently under revision by TBE personnel to improve its support capability to mission managers. A primary goal of this revision is to remove known expendable items from the system and to ensure that only the required items are listed. The first distribution of the revised inventory will be made on February 1, 1985.

WBS 75.10 - Safety and Quality Assurance

We developed a "Mini" Acceptance Review concept and got concurrence from both the Astro-1 and MSL-2 NASA Project Offices.

"Mini" Acceptance Reviews were held on the Astro-1 IRS Structural Assembly and on MSL-2.

We prepared 23 shipments of hardware as follows:

Astro-1	7
MSL-2	2
MEM	2
SL-2	9
SL-3	1
EASE/ACCESS	1
Miscellaneous	3

4. SPACELAB MISSION NO. 1 EXTENSION (EOM-1)

WBS 35.0 - SUPPORT SYSTEM DEVELOPMENT

WBS 35.1 Mission Peculiar Equipment (MPE)

The EOM-1 Mission remains on hold. Hardware development for the original flight is almost complete. Ninety percent of the fabricated hardware is complete, and 98 percent of the purchased items have been received.

Six of the 43 fight cables were delivered to the A&I Facility. The remaining 37 cables were approximately 70 percent complete when the mission was placed on hold due to new requirements and reconfiguration. The EPBD chassis is complete, and the electrical shop is preparing for assembly. Artwork is being prepared for the fabrication of the P.C. Boards.

The first draft of the EOM-1 Mission Kitting Definition was completed and distributed for review. TBE kitting for the mission is now 89 percent complete, and kits will be stored until EOM-1/2 is defined.

WBS 75.0 - PAYLOAD INTEGRATION REQUIREMENTS

WBS 75.2 - MPE Final Design

The MLI blanket and associated materials list for the ES013 GAS bottle was baselined and submitted.

New module cable tray designs were completed, submitted, and baselined.

WBS 75.3 - Command/Data/Communication System Integration

The effort required to reflect the recent changes in the EOM configuration was performed. During the early part of the next period, the CDMS inputs to the IIAs will be defined.

WBS 75.6 - Electrical/EMC System Integration

During this period, we revised the Electrical Cable Interconnect Diagram (F6-40772) and the Electrical System Schematic (F6-40773) to reflect recent changes in the EOM configuration.

We attended the EOM-1 SEPAC experiment battery acceptance review in Japan and witnessed the SEPAC Power Assembly acceptance testing. We also attended the SEPAC Experiment Power Assembly acceptance review. The Power Assembly was accepted by TBE and delivered to NASA in Tokyo, Japan.

WBS 75.7 - Structural/Mechanical System Integration

Stress analysis reports for module Racks 3, 4, 5, and 6 were completed. Structural analyses are now complete for all EOM-1 items which are PMIC's responsibility.

WBS 75.9 - Ground Operations Analysis and Requirements Definition

GIRD maintenance activities continue on an ongoing basis. During this period, Change 1 to the GIRD was processed. This change incorporated 2 ECRs/CCBDs, and 16 change pages were originated and distributed on December 12, 1984. Universal distribution of the baselined GIRD with Change 1 was made on January 3, 1985. During this period, a rewrite of the GIRD to include three more experiments was begun. The experiments are: ATMOS (from SL-3), ALAE (ESO17 from SL-1), and MRSE (EA034 from SL-1). The EOM-1 GIRD was redesignated EOM-1/2 GIRD. The rewrite of Part I has begun, and changes to Part IV were initiated. Changes to Parts II and III were completed and delivered to Word Processing.

WBS 75.10 - Safety and Quality Assurance

Safety compliance data is currently being developed for both flight and ground operations. Preliminary reports will be submitted during the next report period.

WBS 75.11 - Configuration Change Coordination and Processing

We continued to process engineering change requests (ECRs) and engineering change proposals (ECPs) against EOM-1 baselined documentation. This effort required the preparation of PCN folders, the tracking of the change data in the SCIT, and the distribution of change evaluation control board directives (CCBDs) for EOM-1 changes submitted to SPP0. We published an EOM-1 Open Action Status Report, K72F, a TBE

Drawing Release List (DRL), PMIC-DRL-3103, and a Spacelab and Partial Payloads Modification Kit Open Items List, K76A.

SPP0 approved the following EOM-1 ECPs:

<u>ECP NO.</u>	<u>TITLE</u>	<u>ITEM</u>
TBE 149F	Update EOM-1 Cable Length Drawings to Reflect Latest MPE Configuration	Module/Pallet Cables
TBE 150F	Baselining of Module Cable Support Brackets Drawings	Module Cable Brackets

The following ECP was submitted to SPP0 for S&E evaluation:

<u>ECP NO.</u>	<u>TITLE</u>	<u>ITEM</u>
TBE 156F	Update EOM-1 Cable Interconnect Diagram and System Schematics	CID & System Schematics

We baselined the EOM-1 Mission Peculiar Equipment Requirements Document, JA-404.

We continued tracking the 10 identified EOM-1 modification kits.

WBS 75.12 - Interface Agreements

The aproved IRR ECRs for experiments 2, 3, 5, 8, and 33 were incorporated into the baseline issue of the IIAs and submitted for distribution. We initiated development of three IIAs for EOM-2 experiments: ALAE (017) and MRSE (034) from SL-1, and ATMOS from SL-3.

WBS 75.13 - Integrated Payload Compatibility

The MPE requirements document was revised and submitted to reflect current EOM-1 requirements.

We responded to initial direction from the mission manager regarding reconfiguration of EOM-1 to a combined EOM-1/2 mission. We halted impacted activities and supported technical review of requirements to add new experiments and MPE to the mission.

We participated in the SEPAC PWR Hardware Acceptance Review from Furukawa Battery Company and its transfer to the Institute of Space and Astronautical Sciences.

WBS 95.0 - PAYLOAD FLIGHT OPERATIONS INTEGRATION

WBS 95.1 - Onboard Flight/Mission Operations

We submitted Change 2 to Revision C of the Experiment Simulator Model Requirements for the FAUST experiment to EL12. Effort was curtailed starting November 1, 1984, based on proposed changes in the launch schedule.

WBS 95.2 - POCC Operations

The Level IV data base tape was completed and is ready for delivery.

5. SPACELAB MISSION NO. 2

WBS 35.0 - SUPPORT SYSTEM DEVELOPMENT

WBS 35.1 - Mission Peculiar Equipment (MPE)

The PCA handrails were completed and shipped on November 30, 1984. The cruciform MLI for the contingency strut modification was shipped on December 7, 1984. The mod kit for Experiment 7 Splice Plate and Spacer was shipped on December 28, 1984. The general use spare clamps for SL-2 were shipped on January 9, 1985.

WBS 75.0 - PAYLOAD INTEGRATION REQUIREMENTS

WBS 75.1 - Configuration Design Definition

We provided engineering support during the final integration of the cruciform and instruments and coordinated ESA/DS changes to Payload/IPS ICD, 20-ICD-IPS. Changes to the ICD were submitted by ECR for implementation.

WBS 75.2 - MPE Final Design

We provided engineering support during the installation and testing of the Experiment 7 Backup Launch Lock. Additional hardware designs were prepared and released due to previously unknown experiment equipment which prevented meeting the desired pointing angles. In addition, we coordinated a new set of test requirements with KSC and the PI and provided an extensive test/verification procedure. This hardware and the test are currently in process at KSC.

We provided engineering support during the final alignment of the PCA by MDTSCO/KSC and evaluated the final values for compliance with mission requirements.

We delivered an updated stress analysis of the SL-2 cruciform which was based on revised loads from the 1983 coupled loads analysis. We also started a reassessment of several areas of the cruciform, found to be critical from the stress analysis, using force vectors from the recently completed 1984 coupled loads analysis.

Action items stemming from the presentation of the updated PCA Fracture Control Plan to the Fracture Control Board were completed.

WBS 75.6 - Electrical/EMC System Integration

WBS 75.9 - Ground Operations Analysis and Requirements Definition

Maintenance of GIRD requirements is continuing as planned. During this period, seven ECRs were reviewed and comments were transmitted to the lead engineers. Revision A of the GIRD was completed and submitted to the repository for distribution on November 29, 1984. Change 10 to the GIRD was completed and submitted to the repository for distribution on January 8, 1985. This change consisted of seven ECRs/CCBDs which made changes to Parts I, II, and III.

WBS 75.10 - Safety and Quality Assurance

During this report period, the last four action items resulting from the Phase III Flight Safety Review were closed. There are several open hazard reports which will be closed during verification tests at Level III/II at KSC. A delta Phase III Review will be accomplished during March at JSC. Hazard reports are currently being updated to current status. Materials were developed and support provided at the SL-2 Level III/II Integration Readiness Review.

WBS 75.11 - Configuration Change Coordination and Processing

We continued to process ECRs and ECPs against baselined documentation. This effort required the preparation of PCN folders, the tracking of the change data in the SCIT, the distribution of change evaluation requests, and the preparation and processing of CCBDs for SL-2 changes submitted to SPP0. We published a weekly SL-2 Open Action Report, K72B, and a TBE DRL which reflects all SL-2 MPE CEIs being built by TBE.

SPP0 approved the following SL-2 ECPS:

<u>ECP NO.</u>	<u>TITLE</u>	<u>CEI</u>
TBE 144F	Incorporate Outstanding Approved ECRs and FECs to Reflect an Integrated Configuration at KSC	SL-2 PCA Modification

<u>ECP NO.</u>	<u>TITLE</u>	<u>CEI</u>
TBE 146F	Update Part II CEI Specification to Reflect as Integrated Configuration	SL-2 PCA Modification
TBE 148F	Update Part II CEI Specification to Incorporate Outstanding Approved SCN	SL-2 Cruciform
TBE 153F	Revise Experiment 7 Backup Launch Lock Installation to Incorporate New MPE Hardware	SL-2 Exp 7 Backup Latch

We received 125 field engineering changes (FECs) from KSC and distributed them for drawing incorporation. We closed 85 of these FECs.

We continued to perform the configuration management requirements for Spacelab 2 MPE being designed by MSFC/S&E and controlled by the Spacelab Payloads MPE, Level III CCB.

We began publishing on a weekly basis the Spacelab and Partial Payloads Modification Kit Open Items List, Report K76A. We are tracking 14 mod kits which have been authorized for installation in payload delivered hardware.

We continued tracking DNs and assigned actions from the FOR and GOR reviews. A total of 37 actions remains open.

WBS 75.12 - Interface Agreement

Change pages for 8 CRN, and 5 XRT approved engineering changes were incorporated into the IIAs and submitted for distribution. Two ECRs were developed and submitted to revise XRT interface accommodations.

WBS 75.13 - Integrated Payload Compatibility

A detailed analysis of high stress intensity areas in the HRTS experiment (Experiment 10) was completed and submitted. We reviewed eight verification items from six experimenters (Experiments 3, 6, 7, 10, 11, and 13) and we continued to advise them about deficiencies.

At the request of SPP0, a Materials Usage Agreement Certification was written for the SL-2 MPE. This certification contains the final materials list of the configuration shipped and addresses

flammability, toxicity, and thermal vacuum stability requirements and solutions to any problem in these areas. It also contains all Material Usage Agreements written and their status. The objective of the Certification is to certify that the equipment/experiment is flight ready with respect to the materials used.

We continued to support the payload processing activities at KSC through our resident engineering office.

WBS 95.0 - PAYLOAD FLIGHT OPERATIONS INTEGRATION

WBS 95.1 - Onboard Flight/Mission Operations

We are making arrangements to support the Mission Sequence Tests at KSC. This includes submitting requests for CPE primary contact badges, KSC safety training, NASA drivers licenses, and flight hardware handling certificates. We continued to fabricate and distribute PFDF items provided to TBE by the government.

During this report period, we supported crew training in the PCTC and the HOSC. SL-2 sim packs for experiments 7, 8, 13, and 14 and PCAPs for the Red and Blue sim teams were prepared. We released PFDF Basic issues for the following SL-2 experiments: 1, 3, 5, 6, 8, 9, and 11. Part Cs of the DDS Experiment Training Definition for experiments 3, 7, 8, and 9 were submitted.

WBS 95.2 - POCC Operations

The POCC Operations Training Document for the second HOSC paper simulation was prepared and delivered. The POCC cadre participated in the third HOSC paper simulation on January 16 and 17, 1985. PCTC crew training was supported with PFDF crew procedures for experiments 3, 5, 6, 7, 8, 9, 11, and 14 and followed up with the preparation and delivery of the basic issues for these experiments, with the exception of experiment 14, which will be delivered in February. Work progressed in all cadre areas with the delivery of the following SL-2 contract deliverable items: POCC Timeline Data Base; Downlinked Error Message Book; SL-2 Subsystem Data Base; Timeline Configuration Tapes for the SLDPF; Data Flow and Data Systems Configuration Document; Preliminary Issue of ECO

Command Timeline; Preliminary Issue of ECO Position Users Guide; Spacelab Systems-to-Experiments Interface Schematics; Basic Issue of POCC Data Flow Schedules for SIMS, Tests, and Mission; DFA/DREP Inputs to Procedures for POH; ECO, PSE, and CPE comments to procedures for POCC Operations Handbook; Preliminary Payload Activation and Deactivation Procedures; and comments to SL-2 POCC Support and Flight Software. POCC terminal familiarization and training was conducted during this report period.

WBS 95.3 - Payload Data Processing Requirements

The Spacelab Data Processing Facility (SLDPF) Requirements Document was updated and submitted to JA31. The PI Data Requirement Forms (DRFs) have been updated and submitted to JA31.

WBS 95.4 - Public Affairs In-flight Video and Photographic Requirements

We met with JA31 to evaluate a data pack containing TV requirements needed by JSC to prepare an SL-2 TV Ops Book. The meeting resulted in an information update that outlines handling of TV coverage during the SL-2 mission. We attended a working level meeting to participate in a telecon with MSFC, KSC, and JSC to discuss all phases of SL-2 TV coverage. The meeting ended with an agreement that MSFC will handle all TV for the SL-2 mission. We participated in a 24-hour SL-2 paper simulation conducted January 16 and 17, 1985.

6. ASTRO-1 MISSION

WBS 35.0 - SUPPORT SYSTEM DEVELOPMENT

WBS 35.1 - Mission Peculiar Equipment (MPE)

Fabrication of Astro-1 MPE continued to have high priority during this period, and the following work was accomplished:

Cruciform Assembly

- o All trunnions and trunnion rings are installed on the cruciform to make the Cruciform Structural Assembly complete.
- o All instrument mounts are installed on the cruciform.
- o The Cruciform Optical Cube is installed and aligned.
- o Weight and CG has been performed on the Cruciform Structural Assembly.
- o The Cruciform Structural Assembly was transported to the Clean Room at building 4708.
- o A special support structure, the Pedestal Adapter, was designed and installed in the Clean Room seismic alignment area for supporting the cruciform during alignment activities.
- o The alignment tasks at GSFC were completed on December 14, and all pieces were delivered to building 4708. Final tests were completed, and experiment simulators are waiting to be installed on the cruciform.
- o The GFE jack assemblies were modified and mounted to the Pedestal Adapter, which is mounted to the floor of building 4708 Clean Room.
- o The PAR Simulator was completed and installed on the cruciform before the cruciform was mounted on the jack assemblies.
- o A majority of the MLI blankets for the cruciform were received, and approximately 20 percent were installed on the cruciform.

- o The TGSS sensors and cables were installed on the cruciform and tested with the prototype TGSS computer to verify configuration and functional aspects.
- o All mounts requiring thermal release were aligned and set with appropriate clearance and torque.
- o The HUT simulator was installed on the cruciform, and alignment is proceeding.

Integrated Radiator System (IRS)

- o The IRS was returned to the A&I Facility and deintegrated of all test hardware following the Thermal Vacuum Test and Acoustic Test.
- o The IRS was successfully fit checked to the cruciform assembly.

Payload Support Structure Assembly (PSSA)

- o Of 235 fabricated parts, 125 have been completed, and remaining parts are nearing completion.
- o The PSSA assembly fixture was assembled, and mounting pads are to be optically located and aligned.

Optical Sensor Package (OSP)

- o Nineteen of 20 fabricated parts have been completed. The last part is due January 25, 1985.
- o A subcontract for the OSP Baffle was placed with Technicraft. The scheduled completion date is February 1, 1985.

Build Only Hardware

- o The eight breakout boxes were completed and are ready to be shipped.
- o The Cruciform Power Distributor Flight Unit is currently in the electrical shop.

- o The Cruciform Power Distributor Lab Unit is currently in the mechanical shop.
- o The Voltage Boost Regulators are currently in kitting.

Electrical

- o The IPS-EPD Chassis Assembly is currently in the mechanical shop.
- o Thirty-two flight cables were delivered to the A&I Facility.
- o Twelve flight cables are completed and are currently in the bake cycle.
- o Thirty-five flight and IPS Bypass cables are currently being fabricated.

Ground Support Equipment

- o The Cruciform Cradle was returned to TBE after the cruciform was delivered to building 4708, and assembly was completed.
- o The cruciform slings were assembled, proof loaded, and used to handle the cruciform in building 4708.

Wide Field Camera (WFC) for Astro-1

- o The ECE was delivered to the A&I Facility.
- o The WFC Canister Assembly is currently in work.
- o The WFC EGSE Assembly is currently in work.
- o The WFC EIU Assembly is currently in work.
- o One flight cable was delivered to the A&I Facility.
- o Eighteen ground cables were completed and delivered to the A&I Facility.

WBS 75.0 - PAYLOAD INTEGRATION REQUIREMENTS

WBS 75.1 - Configuration Design Definition

The final assembly/integration (A&I) drawings for the integrated payload (Cruciform/Instrument Assembly) and the PSSA were baselined and released.

In addition, A&I drawings for the integrated cable harnesses, cruciform multilayer insulation, and optical sensor package were baselined and released.

WBS 75.2 - MPE Final Design

All flight hardware components for the cruciform, OSP, MLI, and PSSA were completed and baseline released.

MLI blanket assemblies for the instrument mount closeouts, IRS, and cruciform-mounted electronics boxes (installed at KSC) are in process and will be baselined by February 15, 1985. These release dates will not impact TBE hardware delivery schedules or KSC Level IV integration.

Stress analysis of the PSSA was completed during this review period. This analysis is currently being checked for accuracy and applicability to "as built." Other analyses activities have supported release of drawings, supported hardware fabrication, reanalyzed the OSP support plate following design revision, and analyzed the GHE (OSP Handling Fixture and Cruciform Shipping Container). A major effort during this period was the review of the IRS stress analysis to verify applicability to "as built" in preparation for MPE verification by MSFC S&E.

The first phase of the telescope alignment study was performed using a NASTRAN model to analytically predict alignment shifts due to the 1-g environment. The second phase will use measured deflections from the telescope simulator to tune the NASTRAN model.

Results from the Astro-1 second coupled loads analysis were compared with cruciform/PSSA design loads and generally found to be lower.

An updated NASTRAN model of the integrated cruciform (less telescopes and OSP) was submitted for final coupled loads analyses. A comparison model description document was published. Also, the Fracture Control Plan for the PSSA was documented.

The ambient air test of the IRS was successfully completed early in this test period. Post-test analyses for both the thermal vacuum chamber test and the ambient air test are almost complete.

Documentation

of the test and post-test analyses is almost complete, with the report now in the final draft stage.

The design of the Electronic Interface Unit (EIU) Analog/Discrete and Digital Boards was modified to use off-the-shelf wire-wrap boards with integral heatsinks. This design change was required due to manufacturability problems encountered in the fastening of custom heatsinks to an off-the-shelf board supplied without the heatsink. During this period, EIU #1 wire-wrap activities began with scheduled completion by January 30, 1985.

During this period, the TGSS Isothermal tests were successfully completed. The assembly of the TGSS printed circuit boards was started late in the period. All the electrical design documentation has been baselined, thus concluding the design effort for this project.

WBS 75.10 - Safety and Quality Assurance

The Phase III Ground Operations Safety Compliance Data Package is in process, and hazard reports are being updated. Verification data required for closure of hazards was identified and transmitted to hardware developers. The Phase III Ground Safety Review is scheduled for March 1985. Qualification, test, and ground handling procedures for the Wide Field Camera and MPE were reviewed for compliance to safety requirements.

WBS 75.11 - Configuration Change Coordination and Processing

We processed 30 ECRs submitted against Astro-1 baselined documentation. We supported the PMIC/TBE Level IV Configuration Control Board in baselining 72 Astro-1 MPE drawings and associated parts lists, approving 130 Class II engineering change orders, baselining 13 PMIC procedures, and revising 2 procedures. We baselined the Cruciform, IRS, and PSSA Part I CEI Specifications.

We received ECR EL53-0189 for baselining the Astro-1 GIRD. This ECR is in the signature loop. The Level II Board approved this ECR on January 8, 1985.

WBS 75.12 - Interface Agreements

ECRs were developed and submitted to revise the WUPPE and UIT envelope, interface mounts, cable/electrical, and CDMS.

Change pages for two WUPPE, one UIT, and three HUT approved engineering changes were incorporated into the IIAs and submitted for distribution.

WBS 75.13 - Integrated Payload Compatibility

The Astro-1 Flight Operations Review data pack was reviewed for WFC.

Six WFC status reviews were held with MSFC management.

WFC Verification Plan PMIC-28-3847 was baselined.

Verification items are being tracked by the "SCIT" program with the rest of the Astro-1 hardware.

The WFC test flow was reworked to correlate with hardware delivery dates.

Meetings with MSFC testing personnel are continuing to define detail for WFC.

WFC procedures baselined were the function test (ECE) and the function and interface tests (PDSS).

The TGSS "protoflight" boards were assembled in the electronics lab, and the test configuration chassis and isothermal test blocks were fabricated.

The TGSS software and prototype assemblies were tested, and minor changes were made; a timing problem was identified and solved by the addition of a spare gate to the chip-select circuit from the 8085 to the AD364.

TGSS assembly was tested in the TBE lab using an ice bath to verify proper functioning. On December 7, the Isothermal Test Procedure was initiated using MSFC facilities and calibration devices. The test covered -50 °C to +50 °C and indicated the TGSS to be accurate and stable over the designed range.

The fabrication of the TGSS cruciform sensor cable was completed and the sensors were installed on the cruciform the week of January 7th.

In addition to the required "ring-out" of the cables, we performed a channelization test using the prototype assembly and a heat gun to verify sensor channel with cruciform location.

A coordination meeting was held January 14th between TBE and MSFC test facility engineers in preparation for TGSS Thermal Vacuum Qualification Testing.

We baselined 13 procedures, including structural assembly and alignment of the cruciform, installation of mounts on the cruciform, and the instrument simulators coalignment on the cruciform.

The PSSA alignment procedures are in work, ready for baseline review January 18, 1985.

IRS Qualification Test summary reports for acoustic and thermal vacuum tests are in process, with TBE review beginning January 21, 1985.

Verification of MPE is in process. TBE's submittal of verification items to MSFC for evaluation included 12 items for the IRS (1 approved) and 1 item for the cruciform.

The Astro-1 weight report is being updated and submitted to MSFC as the actual weight of the TBE MPE is measured. The latest tabulation shows the TBE MPE weight limit exceeded by 431 kg.

Materials Identification and Usage Lists have been submitted to MSFC/EH-02 for the Cruciform/M61/Cable Installation, OSP Assembly, Cruciform Payload Assembly, and the Cruciform Insulation Assembly.

WBS 95.0 --PAYLOAD FLIGHT OPERATIONS INTEGRATION

WBS 95.1 - Onboard Flight/Mission Operations

PFDF items were provided to support Astro-1 activities.

WBS 95.2 - POCC Operations

During this report period, Astro-1 efforts were mainly directly towards the preparation and development of a simulation training document

for HUT, WFC, SIT, and WUPPE experiments. We attended an IPS working meeting with MSFC, ESA, and Dornier Industries. Items discussed were warning messages, target assignments, guide star selection, and shuttle operations. We discussed Image Motion Compensator (IMC) flows with EL12; then developed and submitted the IMC Flow Chart to Astro-1 EIE for review and comments. We presented to the Astro team meeting preliminary procedures for HUT, WFC, SIT, and WUPPE simulation training. Another POCC cadre member was appointed to the Astro-1 cadre. At this time, we are continuing to build checklists and flow charts for all Astro-1 experiments.

WBS 95.3 - Payload Data Processing Requirements

The initial build of the Telemetry Data Base was completed. There are still some areas requiring additional inputs and corrections; however, the PI DRFs have been submitted to MSFC. These DRFs will be used later as the basis for the GSFC Data Base.

7. SPACELAB MISSION NO. 3

WBS 75.0 - PAYLOAD INTEGRATION REQUIREMENTS

WBS 75.1 - Configuration Design Definition

The SL-3 Module Stowage, OPF Crew Walk-Down Procedure (PMIC-PROC-4568) was prepared with inputs from the ARCLSP and FES/VCGS experiment developer representatives and from the SL-1 OPF Walk-Down Procedure. The preliminary draft was submitted to SPPD for MSFC evaluation.

Revision A of PMIC-PROC-4511 (SL-3 Stowage Installation Procedures) was completed together with required changes in the reference stowage installation sketches and GFE installation parts list.

WBS 75.5 - Environmental System Integration

Following distribution of the SL-3 Contingency Freon Pump Timeline Study on November 15, a response was received from IONs on November 24, regarding extreme thermal limitations. The impact on the previously delivered analysis was assessed.

A telecon in J. Cremin's office with the ATMOS experiment developer revealed that ATMOS had several concerns with the current Freon loop dwell time. ECS/Thermal was requested to review the ATMOS concerns and possibly modify activation timing.

Ongoing review of the Payload Flight Data Files JA-358, JA-357, and JA-362 is being performed to identify any additional ECLSS constraints that may exist.

Evaluation of the SL-3 condensate dump system is underway to determine component impacts due to thermodynamic cooling of the dump line during the post-dump interval if a crewman does not close the dump valve.

Also underway is a review of flight rules, specifically, thermal impacts of configuring the avionics loop to the ascent/entry or the ingress mode, if loss of FSS subfloor sensor(s) occurs (Rule 4.1-12, A2) on orbit.

WBS 75.7 - Structural/Mechanical System Integration

Summary loads and margins of safety for the SL-3 MPESS configuration were provided to JSC for their structural review. Comparisons of SL-3 Module Acoustic Test results to SL-1 flight levels were made and presented in Memorandum P321 (MOD-3) 84-37. A partial revision to the FRR coupled loads was received in late December. This data included MPESS-to-Orbiter relative displacements and MPESS internal loads. A comparison was made between the revised data and the design analysis. All margins of safety were positive.

WBS 75.9 - Ground Operations Analysis and Requirements Definition

GIRD maintenance is continuing as planned. ECRs and deviations continued to be processed as required. Changes 12, 13, and 14 to the GIRD were processed. These changes incorporated 8 ECRs/CCBDs, and 18 change pages were originated and distributed. Seven deviations (numbers 45 through 51) were incorporated into the GIRD.

WBS 75.10 - Safety and Quality Assurance

Support was provided and hazard reports were updated to reflect closure of the AFT experiment. These data were the results of telecons with ARC and JSC. All action items were closed for the Phase III Safety Review, and a Safety Compliance Data Package was developed for transmittal to JSC.

WBS 75.11 - Change Coordination and Processing

SL-3 Configuration Change Coordination and Processing activities during this period encompassed support for MSFC Level II Configuration Control Board meetings on November 30, 1984, and January 11, 1985. This support included the preparation and distribution of meeting agendas; coordination with lead engineers scheduled for Board presentations; and the preparation, coordination, and distribution of Level II CCBDs and meeting minutes documenting Board dispositions/remarks relative to the 10 change requests considered during these meetings. We entered into our standard change integration tracking system data reflecting Board dispositions and assigned actions for these change requests.

We continued to enter in our tracking system the FECs and GIRD deviations processed at KSC. We processed engineering change orders incorporating outstanding FECs into SL-3 hardware/documentation.

We published on a periodic basis reports reflecting discrepancy notice status, SL-3 baselined documents and open actions, deviations/waivers, and TBE-released drawings.

WBS 75.12 - Interface Agreements

The VWFC document was baselined, and nine ECRs to other IIAs were processed.

WBS 75.13 - Integrated Payload Compatibility

One instrument verification item remains open, pending Level II Board action. One integrated payload analysis verification item remains open. There are 58 test and inspection integrated verification items closed and 27 open. These open items are planned work during later integration activities.

One ECR was processed to update the IPRD and another ECR to update mission energy requirements was deferred until the requirements for an April 30, 1985, launch could be included.

A Materials Usage Certification was written and submitted to MSFC for the SL-3 MPE used in the Module and Cargo Bay.

WBS 75.14 - Mass Properties

DR IRO5-749-46 Report No. 24 was submitted November 30, 1984. Updating of mission mass properties was continued during this report period. Inputs were also made to the ARCLSP.

WBS 95.0 - PAYLOAD FLIGHT OPERATIONS INTEGRATION

WBS 95.1 - Onboard Flight/Mission Operations

Crew procedures for the UMS and FES experiments were word processed in final issue form and delivered. We issued PCN No. 1 to the SL-3 Payload System Handbook. We submitted the final issue of the following PFDF (DR FI-07) items: Experiment Operating Procedures for

experiments AFT, ARCLS, ATMOS, GFFC, IONS, and MICG. We also delivered the SL-3 Payload Systems Handbook.

WBS 95.2 - POCC Operations

We submitted the POCC Resource Requirements Document for Joint Integrated Simulation 1. The SL-3 PSE Console Handbook was delivered on November 16, 1984. POCC verification of PSE displays was accomplished as far as the POCC data base allowed. Continued support of the OC team and mission. Revision 6 of the POCC Data Base was prepared and delivered to JSC and the MSFC Document Repository.

WBS 95.3 - Payload Data Processing Requirements

Work continued on revising the SLDPF Data Base Definition Document for the SL-3 mission. A telecon is scheduled for January 21, 1985, with GSFC to finalize this document.

WBS 95.4 - Public Affairs In-flight Video and Photographic Requirements

We coordinated with NASA crew training personnel in accessing the contents of the final edition of the SL-3 TV Ops Book. This edition is being used in crew training sessions. We attended a POCC cadre tagup meeting with the POD, OC, DMC, and PAP. We presented an updated status report concerning the upcoming simulation and mission. We attended a PCAP meeting with the SL-3 crew and the timeline crew. Several changes were made and approved to the SL-3 PCAP.

8. MIDDECK MISSION

WBS 75.0 - PAYLOAD INTEGRATION REQUIREMENTS

WBS 75.2 - MPE Final Design

During this period, we initiated the effort to integrate the GRID Computer with the Middeck Electronics Module in support of the second middeck ADSF flight. We have generated a set of preliminary requirements to be satisfied by the GRID Computer System. We have begun our familiarization with the GRID by prototyping some of the GRID software.

During the early days of the next period, we will be attending the Software Development Course sponsored by GRID Systems in Vienna, Virginia.

WBS 75.11 - Configuration Change Coordination and Processing

We received and processed ECRs to update the ADSF GIRD (JA-249) and the ARC IPRD (JA-286).

We continued to process and track DN closeouts against the ADSF, ARC, and IEF milestone review data packages and to process change requests submitted by MSFC organizational elements. We published on a regular basis reports depicting DN and open change activities.

9. OAST-1 MISSION

WBS 75.0 - PAYLOAD INTEGRATION REQUIREMENTS

WBS 75.13 - Integrated Payload Compatibility

Corrections were made to the Final Flight Evaluation Report, Volume III - Payload Integration, and the document was turned over to the Payload Integration Flight Evaluation Group. This completes the OAST-1 effort under this WBS element.

10. MSL-2 MISSION

WBS 35.0 - SUPPORT SYSTEM DEVELOPMENT

WBS 35.1 - Mission Peculiar Equipment (MPE)

The two ADSF EACs were completed and delivered to MSFC, and the Thermal Vacuum Testing of the Experiment Tape Recorder (ETR) was completed at Wyle Laboratories. Fabrication of MPE for MSL-2 was completed with minor exceptions. These include new items for the EML filter and incorporation of modifications to the MLI tent frames. Assembly hardware which is needed as a result of late design changes was ordered and has been received or is due in the near future. Assembly of the MSL carrier subsystems was initiated and is nearing completion. Assembly of the subsystems into the carrier is now in progress.

Four flight cables and 24 ground/test cables were completed and delivered to the A&I Facility. The ETR Adapter Assembly was also completed and delivered to the A&I Facility. The break-in boxes are currently in work.

During this period, we have completed the fabrication of the Ground and Flight System Control Unit (SCU). All the flight boards have been soldered using TBE in-house wave soldering equipment. At the present time, the SCU has been assembled to the point necessary for installation of instrumentation for the Thermal/Vacuum Qualification Test.

The GSE Rack, which was lacking the System 380 front panel at the end of the last report period, is now complete.

Preliminary versions of the MSL System and the MSL-2 Demonstration Procedures have been prepared and delivered to MSFC for review. The Payload Special Test Equipment (PSTE) has been received and is in the TBE A&I Facility where it will be used to support MSL test activities. The MEA FC-75 Freon Servicer has been received and is currently being modified for use with Freon FC-114. These modifications are approximately 80 percent complete and are expected to be completed well in advance of testing.

The O&M Manual for the MSL Carrier is being prepared as an updated version of the existing MPESS O&M Manual. When completed, this manual will be applicable for all current MPESS and MPESS GSE configurations. It is planned to be available prior to the MSL-2 delivery date.

WBS 35.2 - Ground Software Development

During this period, the major thrust has been to complete the GSE Software necessary to support the SCU Qualification Program. The basic GPC Simulation Software has been completed and will be used to control the hardware under test.

WBS 35.3 - Flight Software Development

During this period, the PCM Software Task, which provides for the generation of the PCM data stream to the MSL ETR, PCM Decommutator and/or the Payload Data Interleaver, was completed. The Analog Task, which provides the analog data acquisition capability, and the Discrete Acquisition Task, which performs PCM data acquisition, were also completed. All three tasks have been integrated and verification is in progress.

The GMT Driver was tested with the actual hardware and integrated with the Operating System. The Command Sequence Table support software was completed during this period. This software expands the commands issued by the Orbiter GPC.

During the latter part of the period, the PCM/MCDS task integration was started. All flight software required to support the SCU Qualification Test is scheduled to be completed by January 21, 1985.

WBS 75.0 - PAYLOAD INTEGRATION REQUIREMENTS

WBS 75.1 Configuration Design Definition

MSL-2 top assembly/installation drawings F4-3162, F4-31612, F4-31518, and F4-10050 were revised during this period to reflect the latest configuration and design.

WBS 75.2 - MPE Final Design

Seventy-nine ECOs, 16 revisions, and 16 new drawings were issued during this period to accommodate MPE design changes, to facilitate manufacturing, purchasing, and or assembly/installation. Stress analyses to verify these design changes were also carried out.

During this period, the following electrical schematics were revised to reflect recent changes and released for baselining:

ETR Test System Schematic	(G4-40771)
MSL Electrical System Schematic	(F4-40607)
MSL-2 Electrical System Schematic	(F4-40611)
GSE Integrated System Schematic	(G4-40729)

We also incorporated the new experiment EMI filter and cables to facilitate MSL testing.

The ETR and associated ground support equipment were analyzed for electromagnetic compatibility. Retrofit of flight and ground hardware elements was subsequently recommended. MSL-2 electrical bonding practices were reviewed to ensure compliance with requirements.

At the end of the report period, the ETR was hand-carried to Kodak-Datatape for rework. During ETR testing, an oscillation at the 60-Inch Per Second (IPS) speed was detected. Kodak-Datatape recommended rework at their facility. The ETR will be shipped back, the first week of the next report period.

During this period, we continued to develop a detailed MSL Interface Test Procedure. The MSL System Test Procedure and the MSL-2 Demonstration Test Procedure were reviewed for technical content.

WBS 75.3 - Command/Data/Communications Systems Integration

The MSL Carrier data bases were generated for the MSL System Integration Test Procedure. The PCM Decommutator formats were prepared for use during the MSL System Test and SCU testing. PIP Annex 4 was updated and the update was submitted to SPP0 for subsequent transmittal to JSC.

As part of our activities, we supported the development of the GIRD and PIP Annex 9, Payload Verification Requirements.

WBS 75.5 - Environmental System Integration

The primary ECS/Thermal task completed during this period was preparation and thermal/vacuum testing of the ETR mounted within its flight recorder/adapter enclosure. The thermal characterization testing enabled derivation of:

- o Maximum allowable flight temperature sensor limits on the on-orbit phase for all ETR playback/record speeds.
- o Maximum allowable sensor (and auto shutdown limit for the ascent phase (standby power level)).
- o One atmosphere to 4 psia flight pressure (at "0-g") thermal characteristics.

Characterization and adequacy of the ETR-to-flight enclosure baseplate conduction interface was demonstrated (as-flown configuration). All points of steady-state and transient thermal investigations were successfully achieved.

Liaison with KSC flow test personnel was pursued to ensure expeditious and efficient final flow balancing ("fine tuning") following flow tests at TBE, Huntsville.

Engineering support was given to expedite preparations for the FC-75 servicer drain, clean and F-114 fill activities. Support continues for development and testing of TBE GSE hardware required for preship testing.

Inputs were provided to the Level I thermal/fluid sections of the GIRD and constraints were developed for preflight and on-orbit MSL-2 ATCS parameters.

MSL-2 ATCS wet-ship requirements were investigated versus dry-ship in light of effects to shorten preflight preparation schedules at KSC.

Development of the MSL-2 on-pad cargo bay purge requirement was initiated to thermally precondition MSL-2 subsystems prior to launch.

Updating of the SCU thermal model and analyses continued. The latest power levels (from tests) are now being incorporated in the model. Planning for the thermal vacuum test continued with the test scheduled for the last part of January at Wyle labs.

WBS 75.9 - Ground Operations Analysis and Requirements Definition

Annex 9, Part II, of the GIRD was submitted for baselining on January 14, 1985. This effort was coordinated with NASA Science and Engineering, SPP0, and TBE electrical, systems, and thermal groups. GIRD development and maintenance continues as planned.

WBS 75.10 - Safety and Quality Assurance

A memorandum was transmitted to MSFC to identify the verification data required to close hazards for the Phase III Safety Data Packages for both flight and ground operation. Both flight and ground reports are being updated to Phase III status.

WBS 75.11 - Configuration Change Coordination and Processing

We provided extensive Configuration Change Coordination and Processing support for TBE/PMIC MSL-2 activities during this period. We processed 70 Level IV CCBs which baselined 119 drawings, approved 159 Class II ECOs, and approved 6 drawing revisions.

We processed the following TBE ECPs through the MSFC Partial Payloads Level II CCB:

<u>ECP NUMBER</u>	<u>SPECIFICATION</u>	<u>CCBD NUMBER</u>	<u>SCN</u>
TBE 152F	C1-4-0056-TBE-A	240-84-0060	8
TBE 155F	C1-4-0056-TBE-A	240-84-0065	9
TBE 157F	C1-4-0056-TBE-A	240-85-0001	10
TBE 158F	C1-4-0056-TBE-A	240-85-0002	11

We continued to process and track activity to close MSL-2 review discrepancy notices (DNs) and to publish on a periodic basis reports reflecting DN status, baselined documentation, and TBE-released drawings.

WBS 75.13 - Integrated Payload Compatibility

To meet an on-dock KSC schedule of March 31, 1985, we established an operations team to work and direct major project or component development activities. The team members work real-time problems and expedite MSL-2 buildup activities. Key members of the team work out of a newly established operations Control Center (14 by 36 ft trailer) at our Research Park A&I Facility. The team was officially formed on December 8, 1984, at the first Program Status Review Team Meeting. These program review meetings are being held every Saturday until MSL-2 is shipped.

During this report period, we have successfully completed thermal vacuum testing on the ETR. We also successfully completed an LTA procedure development test to verify the methods and techniques contained in the MSL system test procedures for verification of the SCU to LTA interface.

The SCU hardware fabrication was completed and the software for the qualification test is being developed. Qualification testing is on schedule to be performed by Wyle Labs starting January 18, 1985.

Considerable progress was made during this report period in finalizing the fabrication of MSL-2 MPE hardware. Approximately 95 percent of the MPE hardware has been fabricated and is being installed on the MSL-2 adapter structure assembly.

We have encountered problems in the SCU software development and integration (primarily due to GSE failures) and late procurement and delivery of some MPE and attachment hardware. We now propose a slip in the MSL-2 on-dock KSC schedule to April 18, 1985. Schedule enhancements and work-arounds are continually being evaluated.

We incorporated an EML EMI filter design into the MSL-2 configuration. We are working the cable design modification and the installation of the filter on the MSL carrier. Documentation for this effort was completed during this report period.

We also incorporated a SCU Level I checkout cable design into the MSL-2 configuration. Documentation for this effort was also completed during this report period.

The MSL-2 Material Identification and Usage List is now being updated. The System Integration Department is supplying personnel as required to assist in this effort. The materials list for the SCU is being typed.

WBS 75.14 - Mass Properties

Continued evaluation and incorporation of revised assembly drawing hardware into the computer data base occurred during this report period.

11. EASE/ACCESS MISSION

WBS 35.0 - SUPPORT SYSTEM DEVELOPMENT

WBS 35.1 - Mission Peculiar Equipment (MPE)

The Adapter Support Structure rails are completed and are ready for assembly of the Adapter Structure. A majority of the EASE/ACCESS handrails have been delivered to TBE from Machine Craft. Delivery of the remaining subcontracted MPE is expected during the next period.

WBS 75.0 - PAYLOAD INTEGRATION REQUIREMENTS

WBS 75.2 - MPE Final Design

During this period, six new drawings were baselined, and four ECOs and three revisions were issued. Changes were made to the MPE structural design to alleviate stress/dynamic problems. The CEI Part II Specification (DR IR-02) was submitted for baselining during this period.

WBS 75.7 - Structural/Mechanical System Integration

The Structural/Mechanical Compatibility Analyses (DR IR-06) document was updated and submitted on schedule. Also, a scheduled update for the NASTRAN model of the EASE/ACCESS launch/landing payload configuration was completed and submitted for coupled loads analysis. In addition, two NASTRAN models of the on-orbit configurations (EASE deployed and ACCESS deployed) were prepared and submitted to Charles Stark Draper Laboratories for on-orbit analyses.

Fracture control plans for the EASE experiment and the ACCESS experiment were completed and presented to the Fracture Control Board. Resulting action items have been answered.

WBS 75.10 - Safety and Quality Assurance

Safety Compliance Data (DR IR-14) and the Total Payload Safety Data Package for Phase II were updated to include the MSFC RIDs from the IPL FDOR review. Experimenter and MPE design changes, as they affect safety, were included in the Phase II report. The package was delivered to JSC for review. Preparations for the JSC Phase II presentation to be held by telecon on January 31, 1985, are in process.

WBS 75.11 - Configuration Change Coordination and Processing

We continued to coordinate the closure of DNs submitted against the EASE/ACCESS Requirements Review/Initial Design Evaluation and FDOR data packages.

We processed miscellaneous ECOs against baselined drawings and entered these changes into SCIT and the TBE drawing release list.

WBS 75.12 - Interface Agreements

The EASE IIA was signed off and baselined December 14, 1984. This completes baselining of both EASE and ACCESS IIAs.

WBS 75.13 - Integrated Payload Compatibility

Thirty-nine DNs have been submitted against TBE-generated documentation from the IPL FDOR. Fifteen have been closed; fourteen have been answered, but not closed; and ten are presently being worked. No project delays are expected, pending closure of all outstanding DNs. Weekly telecons are still being held between all principals to coordinate aspects of the mission on a continuous basis.

Design of MPE continues. The foot restraint supports and handrails are the items presently being designed, with completion expected by February 22, 1985. MPE plates and translational handrails are being manufactured and some have been received. The remainder are expected during the next period. Completion of all manufacturing is expected by March 31, 1985.

Review of the EASE/ACCESS Fracture Mechanics Analysis showed that the PI is using 17-4 ph steel as a latch pin on the EASE experiment. This steel is stress corrosion susceptible. PIs are required to address the use of stress-susceptible materials in safety-critical structures. The PI is being informed that he must justify the use of this material for this application or change materials.

WBS 75.14 - Mass Properties

DR IR-05-4602 Report No. 1 was submitted January 11, 1985. Incorporated into the report were data from updated drawings, parts

lists, and the experimenters. The report represented the first of a series of quarterly reports which track the mass properties status as the design continues toward maturation. A decrease in the mission weight since the IPL FDOR meeting was reflected in this report.

12. MPESS

WBS 35.0 - SUPPORT SYSTEM DEVELOPMENT

WBS 35.1 - Mission Peculiar Equipment (MPE)

Work continued on ECP-133-FRI, which calls for the modification of S/N 003, 004, and 006, and for the manufacture of additional TBE trunnions and keels. Modification materials have been ordered and are due from the vendor on January 29, 1985. Titanium for the trunnions and keels has been ordered, and these materials are due on January 24, 1985. A manufacturing Operations Directive was issued on December 26, 1984, for the manufacture of piece parts for S/N 003 and 004. S/N 006 requires no piece parts manufacture. ECP-154F, which calls for the modification of S/N 001 and 002, and for the manufacture of additional TBE trunnions and keels, was submitted on December 7, 1984.

The rivet tension modification to S/N 004 (ECP-127) is 90 percent complete.

The Adapter Structure Assembly fabrication (C/O MSFC-326) was cancelled by Change Order MSFC-352. Materials were retrieved, and work was stopped on December 20, 1984. Material orders and subcontracts have been cancelled.

WBS 75.0 - PAYLOAD INTEGRATION REQUIREMENT

WBS 75.2 - MPE Final Design

The MPESS longeron trunnion design was revised to allow the MPESS to be used as a deployable payload. The MPESS generic models have been refined and maximum internal member loads for the latest requirements have been generated. Revision to the MPESS structural analyses have been initiated to reflect the latest loads.

WBS 75.11 - Configuration Change Coordination and Processing

We continued to process changes to the MPESS, Contract End Item No. F43001A.

We published on a weekly basis the Spacelab and Partial Payloads Modification Kit Open Items List, Report K76A, which identifies approved modifications to be incorporated in the MPESSs.

SPP0 approved the following MPESS ECPs:

<u>ECP NO.</u>	<u>TITLE</u>
TBE 133F	MPESS Modifications for SN-003, SN-004, and SN-006
TBE 133FR1	MPESS Modifications for SN-003, SN-004, and SN-006

The following ECP was submitted to SPP0 for S&E evaluation:

<u>ECP NO.</u>	<u>TITLE</u>
TBE 154F	MPESS Modifications for SN-001 and SN-002

We continued tracking the six identified MPESS modification kits.

13. MULTI-MISSION

WBS 35.0 - SUPPORT SYSTEM DEVELOPMENT

WBS 35.1 - Mission Peculiar Equipment (MPE)

Change Order MSFC-351, for the fabrication and assembly of electrical components and cables, was received January 2, 1985. Wire and connectors for the first 25 cables were provided as GFP. Also, electrical panels and chassis were GFP. All GFP was received as of January 11, 1985, except for one size of twisted wire and one power supply.

Operations Directives for this change order were issued, and the first 25 cables are to be expedited for Flow 1.

14. PREMISSION DEFINITION

During this period, PMIC received a TD authorizing us to begin a premission definition and compatibility assessment of a BMD/Shuttle Experiments Program. We attended several meetings where experiment requirements and shuttle capabilities were discussed. We are to receive a list of the experiment complements, along with their physical characteristics, data requirements, and preliminary power profiles by January 16, 1985. This data will be used to select a recommended carrier from the NASA inventory by February 15, 1985. The compatibility assessment will be completed by April 30, 1985.